WHAT IS CLAIMED IS:

1. A method for determining the relative cost reduction achieved by the reduction of the complexity of one of a product and a series of products compared with improvements in process activity parameters including at least one of process setup time reduction, product quality improvement, processing time per product unit, the number of different product part numbers processed, the product scrap rate, the product rework rate, rework processing time and average setup to perform rework, and adjusting selected ones of said process activity parameters to modify the number of product units in process.

2. The method set forth in Claim 1 including the step of:

determining the aggregate demand in product units per hour based on the number of different product units produced at a facility multiplied by the customer demand rate for respective product units per hour.

3. The method set forth in Claim 2 including the step of:

determining the common minimum batch size for all product units (MINB) for all workstations from the equation:

$$MINB = \lambda\left[\frac{\sum_{i=1}^{N} S}{1-\sum_{i=1}^{N}\lambda P}\right] = \frac{\Lambda S}{1-\Lambda P}$$

where is the customer demand rate, N is the number of different product part numbers (from i to N), Λ is the aggregate demand for all product units produced in the facility, S is the setup time required to prepare a workstation to produce a batch of product and P is the time required to process one unit of the product at the workstation in question.

4. The method set forth in Claim 3 including the step of:

comparing the non value added cost of process time per product unit with the number of product part numbers being processed.

5. The method set forth in Claim 4 including the step of:

determining the common workstation turnover time (WTT) for all workstations from the equation:

$$WTT = \frac{NS}{1-\Lambda P}$$

6. The method set forth in Claim 5 including the step of:

comparing the non value added cost of defective product units with the number of product part numbers being produced.

7. The method set forth in Claim 5 including the step of:

comparing the non value added cost of demand in product units per unit of time with the number of product part numbers being processed.

8. The method set forth in Claim 5, including the step of:

determining the average total system inventory in a facility for perfectly synchronized average Work In Process from the equation:

$$\left[\frac{(\Lambda P)J\Lambda S}{1-\Lambda P}\right]+\left[\frac{N\Lambda S}{2(1-\Lambda P)}\right]$$

9. The method set forth in Claim 5 including the step of:

determining the average total system inventory in a facility for setup-on-batch-arrival average Work In Process from the equation:

$$\left[\frac{J\Lambda S}{1-\Lambda P}\right]+\left[\frac{N\Lambda S}{2(1-\Lambda P)}\right]$$

10. The method set forth in Claim 5 including the step of:

determining the average total system inventory in a facility for fully asynchronized average Work In Process from the equation:

$$\left[\frac{NJ\Lambda S}{1-\Lambda P}\right]+\left[\frac{N\Lambda S}{2(1-\Lambda P)}\right]$$

11. A method for determining the relative cost reduction achieved by the reduction of the complexity of one of a product and a series of products compared with improvements in process activity parameters including at least one of process setup time reduction, product quality improvement, processing time per product unit, the number of different product part numbers processed, the product scrap rate, the product rework rate, rework processing time and average setup to perform rework, determining maximum workstation turnover time to produce one minimum size batch of each product at each workstation (WTT_{max}) from the equation:

$$WTT_{max} = \underset{j=1,J}{Max}\left[\frac{\sum_{i=1}^{N} S_{ij}}{1-\sum_{i=1}^{N}\lambda_i P_{ij}}\right]$$

wherein, i = part product index (i = 1, …, N) and N is the total number of different parts or products, j equals the workstation (j = 1,…, J), J is the number of distinct workstations, λ_i is the customer demand rate for part product i in units per hour, S_{ij} is the setup time required to prepare workstation j to produce a batch of part/product i and P_{ij} is the time required to process one unit of part/product i at workstation j;

and adjusting selected ones of said process activity parameters to modify the number of product units in process.

12. A method for determining the relative cost reduction achieved by the reduction of the complexity of one of a product and a series of products compared with improvements in process activity parameters including at least one of process setup time reduction, product quality improvement, processing time per product unit, the number of different product part numbers processed, the product scrap rate, the product rework rate, rework processing time and average setup to perform rework, determining the batch size ($MINB_i$) for N products from the equation:

$$MINB_i = \lambda_i WTT_{max} = \lambda_i \underset{j=1,J}{Max}\left[\frac{\sum_{i=1}^{N} S_{ij}}{1-\sum_{i=1}^{N}\lambda_i P_{ij}}\right]$$

wherein, i = part product index (i = 1, …, N) and N is the total number of different parts or products, j equals the workstation (j = 1,…, J), J is the number of distinct workstations, λ_i is the customer demand rate for part product i in units per hour, S_{ij} is the setup time required to prepare workstation j to produce a batch of part/product i and P_{ij} is the time required to process one unit of part/product i at workstation j;

and adjusting selected ones of said process activity parameters to modify the number of product units in process.